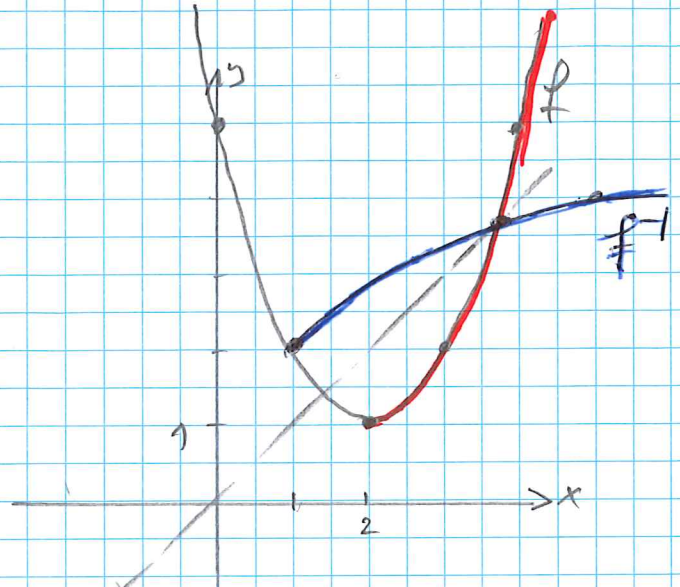


Act 11

$$\begin{aligned} a) f(x) &= x^2 - 4x + 5 \\ &= (x-2)^2 - 4 + 5 \\ &= (x-2)^2 + 1 \end{aligned}$$

$$\text{axe Sym} : x = \frac{-b}{2a} = \frac{4}{2} = 2$$

$$\text{Sommet} : S = (2; 1)$$



$$f: [2; +\infty[\rightarrow [1; +\infty[\text{ bijective}$$

Propriété f^{-1} :

$$y = (x-2)^2 + 1$$

$$\Leftrightarrow y-1 = (x-2)^2 \Leftrightarrow x-2 = \pm \sqrt{y-1} \Leftrightarrow x = 2 \pm \sqrt{y-1}$$

$$\text{on garde } x = 2 + \sqrt{y-1}$$

$$\text{d'où } f^{-1}: [1; +\infty[\rightarrow [2; +\infty[\\ y \mapsto 2 + \sqrt{y-1}$$

Remarque: on peut aussi voir ainsi:

$$x \xrightarrow{f_1} x-2 \xrightarrow{f_2} (x-2)^2 \xrightarrow{f_3} (x-2)^2 + 1$$

$$\text{ou } f_1(x) = x-2$$

$$f_2(x) = x^2$$

$$f_3(x) = x+1$$

$$\text{d'où: } f^{-1} \\ \sqrt{y-1}+2 \xleftarrow{f_1^{-1}} \sqrt{y-1} \xleftarrow{f_2^{-1}} y-1 \xleftarrow{f_3^{-1}} y$$

ou

$$f_3^{-1}(y) = y-1$$

$$f_2^{-1}(y) = \sqrt{y}$$

$$f_1^{-1}(y) = y+2$$

b) cf Act 7...

$$g(x) = \frac{x}{10} \left(\frac{x}{10} + 3 \right) = \frac{x^2}{100} + \frac{3x}{10} = \left(\frac{x}{10} + \frac{3}{2} \right)^2 - \frac{9}{4}$$

$$\text{axe sym: } x = \frac{-\frac{3}{10}}{2 \cdot \frac{1}{100}} = -\frac{30}{2} = -15$$

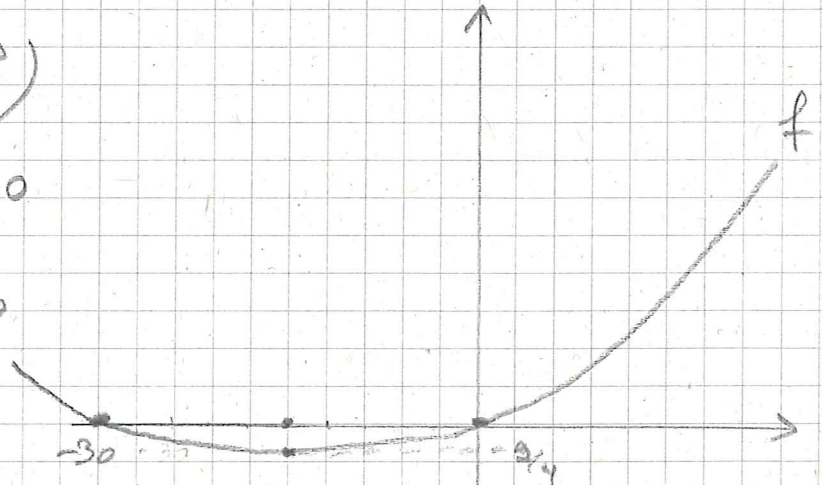
$$\text{Sommet: } S = \left(-15; -\frac{9}{4} \right)$$

$$Z_g: x=0 \text{ ou } \frac{x}{10} + 3 = 0$$

$$\frac{x}{10} = -3$$

$$x = -30$$

$$Z_g = \{-30; 0\}$$



$$\text{d'où: } g: [-15; +\infty[\rightarrow [-\frac{9}{4}; +\infty[\text{ b.i.j.}$$

$$\text{reciproque } g^{-1}: y = \left(\frac{x}{10} + \frac{3}{2} \right)^2 - \frac{9}{4}$$

$$\Leftrightarrow y + \frac{9}{4} = \left(\frac{x}{10} + \frac{3}{2} \right)^2 \Leftrightarrow \pm \sqrt{y + \frac{9}{4}} = \frac{x}{10} + \frac{3}{2}$$

$$\Leftrightarrow \frac{x}{10} = \pm \sqrt{y + \frac{9}{4}} - \frac{3}{2} \Leftrightarrow x = \pm 10 \sqrt{y + \frac{9}{4}} - 15$$

on garde le "+":

$$g^{-1}(y) = 10 \sqrt{y + \frac{9}{4}} - 15$$

$$g^{-1}: [-\frac{9}{4}; +\infty[\rightarrow [-15; +\infty[$$

$$c) \quad h(x) = x^2 - 3x - 4 \\ = (x-4)(x+1)$$

$$Z_f = \{-1; 4\}$$

$$\text{axe: } x = \frac{3}{2}$$

$$\text{Sommet: } h\left(\frac{3}{2}\right) = \frac{9}{4} - \frac{9}{2} - 4 \\ = -\frac{25}{4}$$

$$S = \left(\frac{3}{2}; -\frac{25}{4}\right)$$

$$\text{donc } h: \left[\frac{3}{2}; +\infty\right[\rightarrow \left[-\frac{25}{4}; +\infty\right[\text{ bij}$$

Réécriture:

$$y = x^2 - 3x - 4$$

$$\Leftrightarrow y = \left(x - \frac{3}{2}\right)^2 - \frac{25}{4}$$

$$\Leftrightarrow y + \frac{25}{4} = \left(x - \frac{3}{2}\right)^2$$

$$\Leftrightarrow \pm \sqrt{y + \frac{25}{4}} = x - \frac{3}{2} \quad \Leftrightarrow x = \frac{3}{2} \pm \sqrt{y + \frac{25}{4}}$$

$$\text{on garde le "+" : } h^{-1}: \left[-\frac{25}{4}; +\infty\right[\rightarrow \left[\frac{3}{2}; +\infty\right[$$

$$y \mapsto \frac{3}{2} + \sqrt{y + \frac{25}{4}}$$

